

hairs; fifth sternite no different from third and fourth; sixth sternite three-fifths the length of fifth and widely transversely impressed, the apex and base slightly thickened, carinate, and not interrupted, except very narrowly at apex; disk of sixth sternite wrinkled and not obviously punctate, apparently glabrous and with a very fine longitudinal sulcus. First segment of hind tarsus slightly shorter than second; spurs free. Claw very short and robust, the basal tooth very small, short, and strongly inclined toward, but narrowly separated from, the weakly dilated claw base. Mid and hind tibiae each with several small serrations on the outer margin. Labrum large, very deeply and narrowly cleft to base. Mentum very deeply and longitudinally sulcate. Length 19 mm.

The unique male holotype, in the Saylor collection, is from "Trece Aguas, Cacao, Guatemala." The species appears to be quite different from any known to me in a number of characters but somewhat approaches *P. parvicornis* Moser, from which it may be separated by the different abdominal structure, densely punctate pygidium, and punctate scutellum.

ZOOLOGY.—*Notes on Mexican snakes of the genus Masticophis.*¹

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The following notes are based on the Mexican whipsnakes in the U. S. National Museum (to which specimen numbers refer, unless otherwise indicated), and on a portion of the E. H. Taylor-H. M. Smith Mexican collection. I am much indebted to Dr. E. H. Taylor for loan of material and other courtesies too numerous to mention. A portion of the specimens were collected during my tenure of a Walter Rathbone Bacon Traveling Scholarship, of the Smithsonian Institution.

Masticophis mentovarius (Duméril and Bibron)

Eleven Mexican specimens are from the following localities: CHIAPAS: Tonalá (no. 111270); near Colonia Soconusco (no. 111269). OAXACA: Juchitán (no. 30231); Tehuantepec (nos. 30422-3, 111274-6); Cerro de Huamelula (no. 111272); Mixtequilla (no. 111271); Cerro Arenal (no. 111273). One in the EHT-HMS collection is from Rodriguez Clara, Veracruz (no. 5494).

All have seven labials, but in two the subocular labial (fourth) is partially split. A juvenile (Veracruz), measuring 448 mm in total length (tail 110 mm), has a narrow light stripe along adjacent edges of the third and fourth scale rows, mostly on the third; a similar stripe, a little more distinct, is on the adjacent edges of the first and second scale rows. Both stripes become very faint posteriorly and completely disappear at about the middle of the body.

This species, because of the rudimentary nature of the light stripes, presence of dark spots on the scales, absence of any marked peculiarity in pattern, and its geographical position, appears to represent the nearest approach to the ancestral type of pattern in the genus. From it all other pattern types of the genus may be derived, as a northward radiation of vicariating forms in three series. With *mentovarius* as the starting point, two primary series are evident: one in which cross bands are present and one in which stripes are

¹ Received April 10, 1941.

developed. The latter soon splits, to give rise to the 15-scale row series, as opposed to the primitive, 17-scale row type. The pattern in the most primitive 15-scale row form (*t. australis*), however, is much like the 17-scale row form from which it possibly was derived (*bilineatus*), in respect to the stage of pattern evolution; in each the stripes are incomplete and disappear on at least the posterior fourth of the body. In the end forms of each of these two series (*i.e.*, in *lateralis*, *barbouri*, and *aurigulus* of the 17-scale row series, and in *taeniatus* of the 15-scale row series) the trend toward development of the stripes reaches its extreme, as shown by the full-length stripes. In one form (*t. ruthveni*) the pattern is very simple, and the stripes nearly absent; it is apparently a result of secondary reduction of the pattern.

In the cross-banded series, the trend is toward emphasis of the cross bands and retention of them for a longer period in the life of the individual. This trend reaches its maximum development in *piceus* and *flagellum*, and in a different form in each case. The more primitive of this series do not show any evidence whatever of the cross bands in the adults, but they do show a curious lined or spotted pattern on the individual scales. This tendency is shown somewhat in *mentovarius*, and in *striolatus* the spots at the bases of the scales are well developed. In both products of *striolatus* (*anthonyi* and *lineatulus*) the spots are replaced by a longitudinal dark line on each scale. In the next most primitive member (*flavigularis*) these lines are lost. It is of great significance that the most primitive member of the other two series of the genus (*bilineatus*) toward the southern part of its range has a longitudinal line on each scale, as in the primitive members of the cross-banded series; *bilineatus* also has such short stripes toward the southern part of its range that, save for the dark longitudinal line on the side of the head, it could easily be confused with *striolatus* of the cross-banded series.

Masticophis bilineatus Jan

Masticophis bilineatus Jan, Elenco Sist. Ofidi, p. 65. 1863 ("Messico occid?").

—Jan and Sordelli, Icon. Gén., livr. 22, pl. 6, fig. 2 (Mexico). 1867.

Masticophis semilineatus Ortenburger, Mem. Univ. Michigan Mus. Zool. 1: 48-57, figs. 6-8, pls. 11-13. 1928.

Six specimens are from mainland Mexico: No. 15880, Guaymas, Sonora; no. 46382, Batopilas, Chihuahua; no. 46481, San Juan Capistrano, Zacatecas; no. 46417, Pedro Pablo, Nayarit; no. 32212, Guadalajara, Jalisco; no. 46499, Cuicatlán, Oaxaca. A specimen in the EHT-HMS collection is from a locality between Autlán and Guadalajara, Jalisco (no. 23516).

All have the stripes on the anterior part of the body, and the dark stripe through the upper part of the labials characteristic of the species. In the Guadalajara specimen the lateral light stripes are confined to the nape. The specimen from Cuicatlán has still shorter light stripes, and the body posterior to the nape is almost entirely unmarked; it seems very different from the typical, northern, half-lined specimens, yet the variation exhibited by the few specimens available is so great that I can not satisfactorily define any races within the species.

The young of this species are striped, as the adult. The chief distinguishing feature from *mentovarius*, from which it seems to have been derived, is the longitudinal black line on the sides of the head, involving the upper parts of the supralabials; the remainder of the supralabials are white. In *mentovarius* there is no such black line, and the labials are more or less uniformly mottled. In addition, the fourth and fifth labials normally are fused in the latter spe-

cies, so that only one large labial borders the orbit, but this character is not invariable (*cf.* Hartweg and Oliver, Misc. Publ. Mus. Zool. Univ. Michigan, no. 47: 19–20. 1940). The color character is invariable, however (it is believed), and is the chief reason for not considering these two forms as subspecies.

It is with little doubt that the name *bilineatus* of Jan is associated with this species. In the "Elenco" he states that the scale rows are 17, and that probably the snake came from western Mexico. In 1867 the type was well illustrated and shown to have a pattern precisely like that of the species generally known as *semilineatus*.

It is noteworthy that this is not *Masticophis bilineatus* Cope (Proc. Acad. Nat. Sci. Phila., 1866, p. 127), a name applied without description to two specimens (Field no. 777) in Schott's collection from Yucatán (U.S.N.M. no. 6555 now lost). Cope's synonymy for this name is *Herpetodryas bilineatus* Schlegel ined., Jan (Elenco Sist. Ofidi, p. 81. 1863). Cope probably used this name for the young of *Dryadophis boddaertii melanolomus*, and perhaps Jan had the same form. Regardless, however, of the identity of either Jan's or Cope's specimens, the name was suppressed by Cope in 1866, by his allocation of it to *Masticophis*, in which genus the same name was earlier proposed and diagnosed by Jan (1863).

***Masticophis taeniatus australis*, subsp. nov.**

Holotype.—U.S.N.M. no. 10240, a juvenile female from "Guanajuato," collected by Alfredo Dugès.

Paratypes.—U.S.N.M. no. 111312, Tacicuaró, Michoacán; and EHT-HMS 26227, same locality.

Diagnosis.—Scales in 15-13 rows; a continuous, unbroken white line involving adjacent edges of third and fourth scale rows, extending three-fourths length of body; no or but faint evidence of a light stripe on adjacent edges of ventrals and first scale row; anterolateral edges of middorsal scales faintly lighter; ventrals 202 in female type.

Description of holotype.—Eight supralabials, fourth and fifth entering eye and largely fused together, last three-fifths length of seventh; fifth labial in contact with temporal; loreal single, a little longer than high; two preoculars, upper very large and separated from frontal, lower very minute and in contact with two (third, fourth) labials; two postoculars, upper larger; temporals in two rows of two or three scales; nine infralabials, four in contact with chin shields.

Dorsal scales in 15-15-13 rows, smooth, those on neck with single apical pits (others pitless); ventrals 202; caudals 143; anal divided; total length 517 mm, tail 159 mm.

Dorsal surface of head uniform brown, without light edges on scales; lips white, with a very fine black line on labial border of first five labials; a fine black line on orbital edges of scales entering orbit, least evident on supraocular; a very irregular, broken black border on upper edges of preocular labials; postoculars, most of upper preocular, and anterior edge of loreal white; in temporal region the dark color of the dorsal surface involves the extreme upper edges of the last three labials, and the posterior third of the eighth labial; an irregular, vague light spot in median posterior temporal region; a dark-edged white line beginning at nape and following the adjacent edges of the third and fourth scale rows to about the posterior fourth of the body, where it disappears; below this a brown band involving the second and adjacent half rows; belly mostly white, but with a slight pigmentation lat-

erally, making barely evident a faint light line involving adjacent edges of ventrals and first row of dorsals; this line disappears completely a little anterior to the point where the other line disappears. Posterior fourth of body and tail more or less uniform brown. Dorsal scales between stripes brown, their anterolateral edges lighter, their extreme anterior edges black. Tail white below, slightly stippled anteriorly.

Variation.—The two paratypes from Tacícuaro are also juveniles, as the holotype, and agree exactly with the latter in coloration. The ventrals of neither can be counted, but the caudals in one (male) are 147, in the other (female) 143. Supralabials 8-8 in each, infralabials 10-10, 11-11; oculars, temporals and scale rows as in type.

Remarks.—The closest relatives of *australis* appear to be *girardi* and *schotti*. Since the former is known from localities much nearer the range of *australis*, perhaps it is more closely related to the southern subspecies than is *schotti*, although *australis* certainly resembles the latter more closely. From *schotti*, *australis* differs by having no or very faint evidence of a light line on the adjacent edges of the ventrals and the first row of lateral scales; the belly in *schotti* is strongly pigmented laterally, except toward the posterior part of the body, while in *australis* the belly is almost uniform white, with very little stippling. From *girardi*, *australis* differs by lacking dark marks on the belly, by the presence of only a single lateral light stripe on the adjacent portions of scale rows three and four, by the absence of dark lines on the lateral scale rows, and (?) by the absence of light edges on the dorsal head scales. I have not seen young *girardi*, but according to Ortenburger "the pattern of the young of this species is somewhat different from that of the adult. The light cross-bands are absent except for a very narrow first dorsal band just behind the head. There is present a black median stripe through scale row 1; row 2 is brown with light lower edge; the lower half of row 3 is black, the upper half cream; row 4 is either all cream, or the lower half or two thirds cream, and upper third or half, black; row 5 is either dark like the remainder of the dorsal surface, or the lower fourth is cream and the upper three fourths dark. The light stripe on rows 3 and 4 is the only wide one present and, unless close examination is made, the general impression is that there is present but a single light lateral stripe. There is a dark brown spot on the anterior ends of those scales of row 4, which will, in the adult, be between the light interruptions. The regions which will be occupied by the light cross-bands and interruptions of the adult are already indicated by the lack of the anterior dark marks on the cream-colored scales of row 4. The belly is mottled only about half the way to the tail" (pp. 37-38).

Accordingly, while adults of *australis* are not yet known, the young available do not appear referable either to *girardi* (as it is known in the United States) or to any other previously described form. It should be remarked, however, that the young of the extreme southern "*girardi*" (e.g., Zacatecas, southern Coahuila), the adults of which, like *australis*, lack the light edges on the dorsal head scales (present in northern, typical *girardi*), are not yet known; it is not impossible that they may prove to lack the juvenile characters of typical *girardi*, and be referable to *australis*.

Specimens of *australis* apparently were referred by Ortenburger to two other subspecies. The type was included with *t. taeniatus*, but from this it differs in so many pattern characters that they need not be enumerated here. On the basis of this specimen the range of *t. taeniatus* was conceived to include a portion of the central Mexican plateau. Present evidence does not verify its occurrence south of Lake Sante María, Chihuahua. The single rec-

ord (other than from Guanajuato) of *t. taeniatus* given by Ortenburger for areas south of central Chihuahua, is (apparently) San Pedro, Coahuila. If this record is correct, then it represents the extreme eastern edge of the range of the subspecies in this area, for a specimen of this group in the National Museum from a locality five kilometers southeast of San Pedro proves to be *girardi*. There is another specimen available of *girardi*, from central Zacatecas (La Colorada), which strongly indicates that, if *t. taeniatus* occurs south of Chihuahua, it must be confined to the extreme western edge of the plateau (from which area no specimens of the group are yet available); such a distribution does not seem very probable.

The remaining specimens, apparently of *australis*, available to Ortenburger, were referred by him to *ruthveni*. They are from San Luis Potosí (M.C.Z. nos. 19027-32) and are described as being striped, while the true juveniles of *ruthveni* are not (see discussion of latter).

The subspecies *australis* is perhaps the most primitive of *taeniatus*. Although *ruthveni* may appear to have the most primitive pattern, since in it the stripes are the least well defined of all, it seems only to represent a secondary obsolescence of pattern, perhaps from a type shown by the juveniles of *australis*. Intensification of the pattern of *australis* characterizes *schotti*, certainly a derivative of the former. These three form a unit opposed to the other (*taeniatus* and *girardi*); it is characterized by (1) the presence of light anterolateral edges on the middorsal scales, by (2) the narrowness of the light stripes, and by (3) the absence of light edges on the dorsal head scales.²

The subspecies *girardi* apparently also was derived from *australis* but at an earlier date than the others, since it typically lacks the light anterolateral edges on the dorsal scales and has broader light lines. Its close association with the *schotti* unit, however, is indicated by the absence of light edges on the dorsal head scales in southern specimens, and by apparent intergradation with *schotti*, and probably with *australis*. *M. t. girardi* has short, light stripes, as does *schotti* and *australis*, and in this respect differs from *taeniatus*, in which the light stripes (at least the primary) extend the full length of the body.

Masticophis taeniatus ruthveni Ortenburger

Five specimens of this form have been examined: TAMAULIPAS: 22 km. north of Victoria (no. 11443); Soto La Marina (no. 37546); 50 miles south of Brownsville, Texas (no. 64681). SAN LUIS POTOSÍ: 35 km. northwest of Ciudad Maiz (EHT-HMS 23517). MICHOACÁN: Zamora (EHT-HMS 21452).

Ortenburger (p. 46) states: "In one specimen, not fully grown (M.C.Z., no. 13951), a light lateral stripe [covering adjacent parts of rows 3 and 4, bordered by black' (p. 21)] is present and continues the length of the body. Another specimen (U.S.N.M., no. 1974), very young, shows this light lateral stripe also, and except for the fact that the typical yellow marks on the dorsal scales are lacking it is quite similar to *schotti*. Six other young specimens were received from San Luis Potosí (M.C.Z. 19027-19032). These likewise show the lateral light stripe and lack of the light marks on the dorsal scales."

U.S.N.M. no. 1974 was from Matamoras, Tamaulipas, and is labeled in the catalog "*schotti*," but is now lost. In view of Gloyd and Conant's work (Occ. Pap. Mus. Zool. Univ. Mich., no. 287: 1-17, pls. 1-3. 1934) on this form and *schotti*, there can be but little doubt that this specimen was either a young *schotti* or else a *schotti-ruthveni* intergrade. Probably M.C.Z. no.

² The first and third characters need verification in adult *australis*; that they exist in present specimens of that form may be simply a juvenile characteristic.

13951 is the same, while M.C.Z. nos. 19027-32 almost certainly belong to *australis*. That none of these have the light marks on the anterolateral borders of the dorsal scales is rather obviously a juvenile character.

That the young of true *ruthveni* are not striped is shown by EHT-HMS no. 23517, from Ciudad Maiz. This specimen measures 495 mm in total length, the tail 160 mm. In color and pattern it is precisely like typical adult *ruthveni*, save that the dorsal scales are but very faintly light-edged anteriorly. No distinct stripes whatever are evident anteriorly; a faint, threadlike light line is visible on the neck at the lower edge of the fourth scale row, but in no sense is this similar to the lateral light line of *schotti* or *australis*; adult *ruthveni* also show an exactly similar line (see Ortenburger, pl. 9).

The most extraordinary specimen in the entire series is an apparently perfectly typical adult *ruthveni* from Zamora, Michoacán, a locality so far removed from others from which the subspecies is known that it is impossible to guess the significance of this record. Unfortunately the snake is badly crushed, having been found on a road. Its scale rows, supralabials, and oculars are typical; the dorsal surface is nearly uniform blue-green, except for yellowish borders on the extreme anterolateral edges of the median rows of dorsals; no stripes are present, except a very faint one anteriorly along the adjacent edges of the ventrals and first scale row.

This specimen may be just what it appears to be—a typical *ruthveni*; but if so a broad overlapping of the ranges of *australis* and *ruthveni* is indicated. Regardless of the manner of interpretation of this specimen and its significance, a considerable juggling is necessary in order to reconcile all known facts; so much hinges upon this specimen alone that speculation upon it should await verification of the record by further material.

Masticophis taeniatus girardi (Stejneger and Barbour)

Four specimens are known from Mexico, from "Chihuahua" (no. 14272); La Cuchilla, 5 miles south of San Pedro, Coahuila (no. 105300); 14 km. north-east of Pedriceña, Durango (EHT-HMS); and La Colorada, Zacatecas (EHT-HMS no. 5437, described by Dunkle and Smith, Occ. Pap. Mus. Zool. Univ. Mich., no. 363: 5-6. 1937). These lack the light borders on the dorsal head scales, typical of northern specimens.

Masticophis taeniatus taeniatus (Hallowell)

A single Mexican specimen examined is from Lake Santa María, Chihuahua (no. 46594).

Masticophis flagellum striolatus (Mertens)

Coluber striolatus Mertens, Zoologica 32: 190. 1934 (*nom. nov.* for *Coluber lineatus* [Duméril and Bibron], preoccupied by *Coluber lineatus* Linnaeus).

Masticophis lineatus Ortenburger, Mem. Mus. Univ. Michigan 1: 134-138, fig. 27, pl. 25. 1928.

Twenty-three specimens are in the collection: Nos. 24680-2, María Magdalena, Tres Marias Islands; no. 46483, Acaponeta, Nayarit; no. 46386, Atemajac, Jalisco; no. 111278, Coyuca, Guerrero; no. 111277, 10 km. south of Cuernavaca, Morelos; nos. 32178, 32221-2, 32232-3, 62027-9, 62031-4, Colima, Colima; no. 32344, Zacatula River, near Lauria, Guerrero; no. 62026, Sierra Madre, Chacan River, Michoacán; no. 62030, Hurcha Volcano, plains of Nuruapa, Michoacán.

The original description (of *lineatus* Duméril and Bibron) appears to be a composite, based partly upon *striolatus* as at present defined and partly upon *lineatulus*. Fortunately a specimen from Colima is mentioned, which, for geographic reasons, probably is *striolatus* as at present understood.

Small specimens show traces of cross bands anteriorly, but in this form the banded pattern is less distinct than in any other of the species. This form is so obviously a close relative of *lineatulus*, which occurs in adjacent territory, that I believe there is little doubt they are subspecies. It moreover appears that *striolatus*, not *flavigularis*, as suggested by Ortenburger, is the most primitive form of the species *flagellum*.

***Masticophis flagellum lineatulus*, subsp. nov.**

Holotype.—U. S. N. M. no. 105292, female, from a locality eleven miles south of San Buenaventura, Chihuahua.

Paratypes.—Thirteen in the U. S. National Museum: No. 12676, Guajuato; nos. 14279, 14283, Chihuahua; no. 26151, "Mexico"; no. 46355, Guanacevi, Durango; no. 1988, Alamo de Parras, Coahuila; nos. 104675-6, Río Santa María, near Progreso, Chihuahua; no. 1989, Cobre Mines, New Mexico; no. 4388, Laguna, N. Mex.; no. 8429, "New Mexico"; no. 22142, Las Cruces, N. Mex.; no. 102240, Jornada Experimental Range, Doña Ana County, N. Mex. One in the Museum of Comparative Zoology, no. 14280, from Las Cruces, N. Mex. One in the EHT-HMS collection, no. 5388, between Torreón and San Pedro, Coahuila.

Diagnosis.—Scales in 17 rows, posteriorly 12 or 13; ventrals 190 to 198, caudals 99 to 110; posterior portion of belly and subcaudal surface red or marked with red (except in juveniles), even in long-preserved specimens (red not fading greatly); each dorsal scale with a longitudinal dark line or a posterior dark spot; head scales not light edged in young, no light loreal stripe (center may be light); young with cross bands 2 or 3 scales long, extending laterally to ends of ventrals, disappearing on middle of body.

Description of holotype.—Rostral rather prominent, strongly pointed posteriorly, as high as wide, portion visible from above as long as internasals; latter three-fourths length of internasals; frontal twice as broad anteriorly as between middle of orbits and posteriorly, about as long as its distance from tip of snout, very slightly shorter than frontal; nasal completely divided, anterior section a little larger and higher than posterior; loreal a little longer than high, in contact with two labials and lower preocular; two preoculars, upper in contact with frontal, lower much smaller and wedged between third and fourth supralabials; two postoculars, upper a little the larger; two irregular rows of temporals; an anterior temporal wedged between fifth and seventh labials, above sixth (which is small); eight supralabials, fourth and fifth entering orbit, fifth in contact with a temporal, seventh and eighth larger than others; infralabials 10-11, four in contact with anterior chin shields, two with posterior, fifth much the largest; anterior chin shields shorter, and a little broader, than posterior.

Dorsal scales smooth, with double apical pits, in 17-17-12 rows; ventrals 197; anal divided; tail incomplete. Total length 1,481 mm, tail 336 mm (plus a few mm).

Color.—Head light yellowish brown, darker toward posterior sutures; sides of head light yellowish brown, with a lighter area in the preocular, loreal, nasal and rostral; a dark, rounded spot in center of nasal; supralabials white (cream) below a line about even with posterolateral border of seventh labial and middle of subocular labials.

Dorsal ground color light yellowish brown, becoming more reddish toward middle of body, posteriorly mostly salmon red; all anterior dorsal scales with a central, longitudinal black streak, which becomes more spot-like on scales in middle of body, barely indicated on posterior scales; as the black spots become less distinct, the red areas become more distinct, the posterior scales being mostly red (with a little black near tip), with a white (cream) base; dorsal surface of the tail is even more strongly marked with salmon red.

Posterior edge of mental and broad areas near the sutures between the infralabials and chin shields, black-marked; a double row of black spots beginning with anterior ventral scales; posteriorly these spots becoming mixed with red and soon mostly red and very little black; anterior ground color of belly yellow, this color extending onto lower dorsal scale rows; toward middle of belly the color is largely replaced by salmon red, and posteriorly the belly is entirely red, with the double row of black spots faintly indicated; ventral surface of tail mostly red, the bases of the scales lighter (cream).

Variation.—The variation in scutellation is given in Table 1. In coloration the adult and subadult paratypes agree with the holotype, except that those long preserved have lost much of the original color. Without a single exception, however, every adult shows the typical salmon red color at least on the subcaudal surface.

Two very young specimens are from "Guanajuato" and "Mexico," both collected by Dugès and therefore probably from the vicinity of the city of Guanajuato. In these the dorsal head scales are not light-margined; sides of head with numerous vertical light marks, one on frontal; a light spot in loreal (not a stripe) and another on posterior section of nasal. Anterior part of body darker than posterior, and with narrow light cross bands covering considerably less than one scale length, placed at intervals of two or three scale lengths; these light cross bands extend to ventrals, somewhat irregular middorsally; tail, and middle and posterior part of body unmarked, becoming lighter posteriorly.

TABLE 1.—SCALE COUNTS IN MASTICOPHIS FLAGELLUM LINEATULUS

Number	Sex	Scale rows	Ventrals	Caudals	Supral.	Infral.	Proc.	Ptoc.	Temp.
1989	♀?	17-12	198	100	8-8	10-10	2-2	2-2	2-2
8429	♀	17-13	198	107	8-8	9-10	2-2	2-2	2-2
12676	♀	17-13	194	110	8-8	11-12	2-2	2-2	2-2
14279	♀	17-12	190	—	8-8	12-13	2-2	2-2	2-2
14283	♀	17-12	194	100	8-8	11-11	2-2	2-2	2-2
26151	♀	17-13	191	109	8-8	10-11	2-2	2-2	2-2
105292	♀	17-12	197	—	8-8	10-11	2-2	2-2	2-2
1988	♂	17-12	—	—	—	—	—	—	—
4388	♂	17-12	189	106	8-8	10-11	2-2	2-2	2-2
22142	♂	17-12	199	—	8-8	10-12	2-2	2-2	2-2
46355	♂	17-12	196	99	8-8	10-11	2-2	2-2	2-2
102240	♂	17-13	200	—	8-8	9-10	2-2	2-2	2-2
104676	♂	17-12	198	105	8-8	11-11	2-2	2-2	2-2
104675	♂	17-12	198	107	8-8	11-11	2-2	2-2	2-2

A young specimen, from "New Mexico," appears to be an intergrade between *lineatulus* and *flavigularis*, as it has the striped pattern anteriorly of the former, in addition to two narrow, widely separated dark cross bands typical of juvenile *flavigularis*. Another specimen, also young, from Doña Ana County, N. Mex., appears to be an intergrade, as it has dim evidence anteriorly of cross bands somewhat like those of juvenile *flavigularis*; the

specimen is so nearly grown, however, that the nature of the cross bands is not readily discerned; the striped pattern anteriorly is distinct and typical of *lineatulus*. A specimen in the University of Michigan Museum of Zoology, from 8 miles north of Hereford, Ariz. (no. 69668) closely approaches *lineatulus*, differing only by having a light loreal stripe as in *piceus* (see color description by Gloyd, Bull. Chicago Acad. Sci. 5: 117-118. 1937).

Remarks.—The adults of this subspecies are readily distinguishable from *flavigularis* and *piceus* by the striped scales; they also lack the loreal stripe

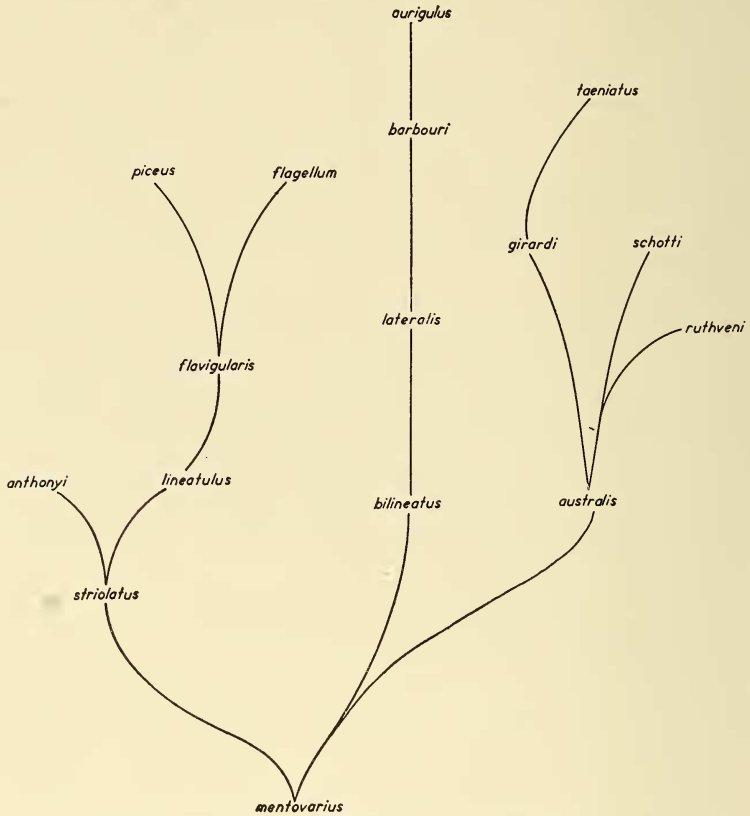


Fig. 1.—Possible phylogeny of the members of *Masticophis*.

of the latter. Preserved *lineatulus* also retain the red ventral color, while *flavigularis* and *piceus*, although frequently brilliant red in life, lose this color very quickly in preservative.

The young of *lineatulus* are strikingly different from those of *flavigularis*, with narrow, dark cross bands; *piceus*, with a light loreal stripe and the two or three anterior dark bands broad and very dark (black), those following conspicuously lighter; and *striolatus*, with light margins on the dorsal head scales.

Ortenburger anticipated the separation of this subspecies in his discussion of *flavigularis*, with which specimens of *lineatulus* were associated. "One specimen (M.C.Z., no. 14280) is particularly interesting in that it approaches

piceus in ventral coloration and number of ventrals. The belly is red like that of the typical *piceus* of the west [but which does not retain this red in preservative], and moreover it has 202 ventrals, a much higher number than would be expected for *flavigularis*. It is from the western part of the range of the form—Las Cruces, Doña Ana County, New Mexico. Four other specimens show a similar coloration. Two of these are from Chihuahua and another from Durango, and another from San Luis Potosi. A singular dorsal coloration is exhibited by all these specimens. Practically all the dorsal scales have an elongate median dark mark. Whether these very few interesting specimens will eventually be considered as belonging to a distinct form cannot now be determined" (pp. 102-103).

Masticophis flagellum flavigularis (Hallowell)

Six specimens: NUEVO LEÓN: 15 miles north of Monterrey (no. 111268); Pesqueria Grande (no. 1995); Santa Caterina (no. 1992); TAMAULIPAS: Mier (no. 48091). SAN LUIS POTOSÍ: Chijol (no. 46476). SONORA: San Bernardino Ranch (no. 21052). All are typical adults, of nearly uniform light brownish-gray color.

Juveniles have very narrow, dark cross bands, and in this respect they differ from the young of all other subspecies.

The record from extreme northwestern Sonora is substantiated by another specimen of *flavigularis* from Apache, Ariz. (no. 8428, juvenile). These two specimens lack the loreal stripe and dark anterior cross bands of *piceus* and also the red ventral color and striped scales of *lineatulus*. The subspecies *flavigularis* apparently surrounds the latter north of the United States-Mexico boundary.

Masticophis flagellum piceus (Cope)

The only specimen from mainland Mexico is one from Altata, Sinaloa (no. 33570).

Juveniles of this subspecies have a distinct white loreal stripe, as has previously been pointed out; the cross bands on the body extend to the ventral surface; the posterior part of the body is considerably lighter (uniform) than the anterior (banded); and the extreme anterior nuchal bands are darker than the succeeding bands. In Arizona and Sinaloa specimens the dorsal head scales usually are light-edged, and the anterior cross bands are less distinctly differentiated from the succeeding bands; California specimens usually do not have the dorsal head scales light-edged, and the anterior cross bands are very well differentiated from (darker than) the succeeding bands.

It is obvious that the black phase for which the name *piceus* has generally been used can not have arisen by the same procedure as have all other members of *Masticophis* recognized at present. It is, almost beyond question, a mutant form, occurring within the range of "*frenatus*"; it does not seem of greater significance than the red phase of the same species. Taylor (Kansas Univ. Sci. Bull. 24: 491. 1936 [1938]) describes a specimen in which only "the anterior half of the body is black. About the middle of body there are three, black-spotted, reddish bands, while the latter third of the body is more or less reddish. The specimen was captured in the heat of the day under a flat rock, near La Posa [Sonora]." It is unfortunate that the name of an atypical phase must, because of priority, be used for the species; such is the case, however, in this form, for *piceus* (1892) antedates the only other name (*frenatus*, 1893) that has been applied to this race. The latter name, more-

over, is not available under any circumstance, since it is a suppressed homonym of *Herpetodryas frenatus* Gray (Ann. Mag. Nat. Hist. (2) 12: 390. 1853.) from India, placed in the genus *Coluber* (*Coluber frenatus*, a valid species) by Boulenger (Fauna Brit. India, Rept., p. 335. 1890). If the California specimens are ultimately distinguished from Arizona ones, or if the name *piceus* is restricted to the black phase, a new name or names will be required.

KEY TO MAINLAND MEXICAN MASTICOPHIS

1. Scales in 15 rows 2
Scales in 17 rows 6
2. A distinct lateral light stripe involving edges of third and all or adjacent edge of fourth row 4
No distinct lateral light stripe involving third and fourth rows
. *taeniatus ruthveni*
3. Upper lateral light stripe involving fifth row of scales 4
Upper lateral light stripe confined to adjacent edges of third and fourth rows, always continuous 5
4. Lateral light stripe broken or partially interrupted anteriorly, not reaching anal region *taeniatus girardi*
Lateral stripe continuous and uniform in character throughout its length, reaching anal region *taeniatus taeniatus*
5. A very distinct, light lateral stripe on adjacent edges of ventrals and first row of dorsals; young and adults *taeniatus schotti*³
No or only faint evidence of a lateral light stripe on adjacent edges of ventrals and first row of dorsals; young only (adult not known)
. *taeniatus australis*
6. A single labial entering orbit *mentovarius*
Two labials entering orbit 7
7. No longitudinal light stripes exclusively on lateral rows anteriorly; if present, equally distinct on dorsal as on lateral rows 9
Lateral light stripes present anteriorly, these more distinct than dorsal light stripes (if any) 8
8. Lips mottled *mentovarius*
Lips mostly white, bordered above by black *bilineatus*
9. In young, neck bands much darker than succeeding bands, considerably broader than spaces between them; in adults, neck bands always visible; a longitudinal white stripe through loreal *flagellum piceus*
In young, neck bands not greatly darker than those following; in adults, if bands are visible, they are narrower than the spaces between them; no distinct white stripe through loreal 10
10. Caudals 109 or more; a dark spot at the base of each scale; usually no dark lines through the centers of anterior scales *flagellum striolatus*
Caudals usually less; no dark spots at the bases of the scales, or if so a dark line through the center of the anterior scales 11
11. In adults, a dark line through the center of each scale at least on anterior part of body, and at least subcaudal surface salmon red in preserved specimens; in young, the dark bands broader than the light interspaces, which are incomplete and irregular *flagellum lineatulus*
No dark lines through centers of scales; ventral surfaces not red except in live or very recently preserved specimens; young with narrow dark crossbands, narrower than light interspaces, which are complete
. *flagellum flavigularis*

³ Not yet recorded from Mexico, but almost certainly occurring.